

SEQUENCE LISTING
#19/C

<110> Immulogic Pharmaceutical Corp.

<120> T CELL EPITOPE OF RYEGRASS POLLEN ALLERGEN

<130> IMI-040CP3

<140> 08/737,904

<141> 1996-11-20

<150> 08/106,016

<151> 1993-08-13

<160> 60

<170> PatentIn Ver. 2.0

<210> 1

<211> 1229

<212> DNA

<213> Lolium perenne

<220>

<221> CDS

<222> (40)..(942)

<400> 1

cgctatccct ccctcgtaca aacaaacgca agagcagca atg gcc gtc cag aag 54
 Met Ala Val Gln Lys
 1 5

tac acg gtg gct cta ttc ctc gcc gtg gcc ctc gtg gcg ggc ccg gcc 102
 Tyr Thr Val Ala Leu Phe Leu Ala Val Ala Leu Val Ala Gly Pro Ala
 10 15 20

gcc tcc tac gcc gct gac gcc ggc tac acc ccc gca gcc gcg gcc acc 150
 Ala Ser Tyr Ala Ala Asp Ala Gly Tyr Thr Pro Ala Ala Ala Thr
 25 30 35

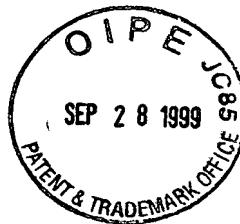
ccg gct act cct gct gcc acc ccg gct gcg gct gga ggg aag gcg acg 198
 Pro Ala Thr Pro Ala Ala Thr Pro Ala Ala Ala Gly Gly Lys Ala Thr
 40 45 50

acc gac gag cag aag ctg ctg gag gac gtc aac gct ggc ttc aag gca 246
 Thr Asp Glu Gln Lys Leu Leu Glu Asp Val Asn Ala Gly Phe Lys Ala
 55 60 65

gcc gtg gcc gcc gct gcc aac gcc cct ccg gcg gac aag ttc aag atc 294
 Ala Val Ala Ala Ala Asn Ala Pro Pro Ala Asp Lys Phe Lys Ile
 70 75 80 85

ttc gag gcc gcc ttc tcc gag tcc tcc aag ggc ctc ctc gcc acc tcc 342
 Phe Glu Ala Ala Phe Ser Glu Ser Ser Lys Gly Leu Leu Ala Thr Ser
 90 95 100

gcc gcc aag gca ccc ggc ctc atc ccc aag ctc gac acc gcc tac gac 390



Ala Ala Lys Ala Pro Gly Leu Ile Pro Lys Leu Asp Thr Ala Tyr Asp
105 110 115

gtc gcc tac aag gcc gcc gag ggc acc ccc gag gcc aag tac gac 438
Val Ala Tyr Lys Ala Ala Glu Gly Ala Thr Pro Glu Ala Lys Tyr Asp
120 125 130

gcc ttc gtc act gcc ctc acc gaa gcg ctc cgc gtc atc gcc ggc gcc 486
Ala Phe Val Thr Ala Leu Thr Glu Ala Leu Arg Val Ile Ala Gly Ala
135 140 145

ctc gag gtc cac gcc gtc aag ccc gcc acc gag gag gtc cct gct gct 534
Leu Glu Val His Ala Val Lys Pro Ala Thr Glu Glu Val Pro Ala Ala
150 155 160 165

aag atc ccc acc ggt gag ctg cag atc gtt gac aag atc gat gct gcc 582
Lys Ile Pro Thr Gly Glu Leu Gln Ile Val Asp Lys Ile Asp Ala Ala
170 175 180

ttc aag atc gca gcc acc gcc aac gcc ccc acc aac gat aag 630
Phe Lys Ile Ala Ala Thr Ala Ala Asn Ala Ala Pro Thr Asn Asp Lys
185 190 195

ttc acc gtc ttc gag agt gcc ttc aac aag gcc ctc aat gag tgc acg 678
Phe Thr Val Phe Glu Ser Ala Phe Asn Lys Ala Leu Asn Glu Cys Thr
200 205 210

ggc ggc gcc tat gag acc tac aag ttc atc ccc tcc ctc gag gcc gcg 726
Gly Gly Ala Tyr Glu Thr Tyr Lys Phe Ile Pro Ser Leu Glu Ala Ala
215 220 225

gtc aag cag gcc tac gcc acc gtc gcc gcc gcg ccc gag gtc aag 774
Val Lys Gln Ala Tyr Ala Ala Thr Val Ala Ala Ala Pro Glu Val Lys
230 235 240 245

tac gcc gtc ttt gag gcc gcg ctg acc aag gcc atc acc gcc atg acc 822
Tyr Ala Val Phe Glu Ala Ala Leu Thr Lys Ala Ile Thr Ala Met Thr
250 255 260

cag gca cag aag gcc ggc aaa ccc gct gcc gcc gct gcc aca ggc gcc 870
Gln Ala Gln Lys Ala Gly Lys Pro Ala Ala Ala Ala Thr Gly Ala
265 270 275

gca acc gtt gcc acc ggc gca acc gcc gcc ggc ggt gct gcc acc 918
Ala Thr Val Ala Thr Gly Ala Ala Thr Ala Ala Gly Ala Ala Thr
280 285 290

gcc gct gct ggt ggc tac aaa gcc tgatcagctt gctaatac tactgaacgt 972
Ala Ala Ala Gly Gly Tyr Lys Ala
295 300

atgtatgtgc atgatccggg cggcgagtgg ttttggat aattaatctt cgtttcgtt 1032

tcatgcagcc gcgatcgaga gggcttgcatt gcttgcata attcaatatt tttcatttct 1092

ttttgaatct gtaaatcccc atgacaagta gtggatcaa gtcggcatgt atcaccgttg 1152

atgcgagttt aacgatgggg agtttatcaa agaatttatt attaaaaaaaaaaaaaaa 1212

aaaaaaaaaaa aaaaaaaaa

1229

<210> 2

<211> 301

<212> PRT

<213> Lolium perenne

<400> 2

Met Ala Val Gln Lys Tyr Thr Val Ala Leu Phe Leu Ala Val Ala Leu
1 5 10 15

Val Ala Gly Pro Ala Ala Ser Tyr Ala Ala Asp Ala Gly Tyr Thr Pro
20 25 30

Ala Ala Ala Ala Thr Pro Ala Thr Pro Ala Ala Thr Pro Ala Ala Ala
35 40 45

Gly Gly Lys Ala Thr Thr Asp Glu Gln Lys Leu Leu Glu Asp Val Asn
50 55 60

Ala Gly Phe Lys Ala Ala Val Ala Ala Ala Asn Ala Pro Pro Ala
65 70 75 80

Asp Lys Phe Lys Ile Phe Glu Ala Ala Phe Ser Glu Ser Ser Lys Gly
85 90 95

Leu Leu Ala Thr Ser Ala Ala Lys Ala Pro Gly Leu Ile Pro Lys Leu
100 105 110

Asp Thr Ala Tyr Asp Val Ala Tyr Lys Ala Ala Glu Gly Ala Thr Pro
115 120 125

Glu Ala Lys Tyr Asp Ala Phe Val Thr Ala Leu Thr Glu Ala Leu Arg
130 135 140

Val Ile Ala Gly Ala Leu Glu Val His Ala Val Lys Pro Ala Thr Glu
145 150 155 160

Glu Val Pro Ala Ala Lys Ile Pro Thr Gly Glu Leu Gln Ile Val Asp
165 170 175

Lys Ile Asp Ala Ala Phe Lys Ile Ala Ala Thr Ala Ala Asn Ala Ala
180 185 190

Pro Thr Asn Asp Lys Phe Thr Val Phe Glu Ser Ala Phe Asn Lys Ala
195 200 205

Leu Asn Glu Cys Thr Gly Gly Ala Tyr Glu Thr Tyr Lys Phe Ile Pro
210 215 220

Ser Leu Glu Ala Ala Val Lys Gln Ala Tyr Ala Ala Thr Val Ala Ala
225 230 235 240

Ala Pro Glu Val Lys Tyr Ala Val Phe Glu Ala Ala Leu Thr Lys Ala

245

250

255

Ile Thr Ala Met Thr Gln Ala Gln Lys Ala Gly Lys Pro Ala Ala Ala
260 265 270

Ala Ala Thr Gly Ala Ala Thr Val Ala Thr Gly Ala Ala Thr Ala Ala
275 280 285

Ala Gly Ala Ala Thr Ala Ala Gly Gly Tyr Lys Ala
290 295 300

<210> 3

<211> 20

<212> PRT

<213> Lolium perenne

<400> 3

Ala Asp Ala Gly Tyr Thr Pro Ala Ala Ala Ala Thr Pro Ala Thr Pro
1 5 10 15

Ala Ala Thr Pro
20

<210> 4

<211> 20

<212> PRT

<213> Lolium perenne

<400> 4

Ala Thr Pro Ala Thr Pro Ala Ala Thr Pro Ala Ala Ala Gly Gly Lys
1 5 10 15

Ala Thr Thr Asp
20

<210> 5

<211> 20

<212> PRT

<213> Lolium perenne

<400> 5

Ala Ala Ala Gly Gly Lys Ala Thr Thr Asp Glu Gln Lys Leu Leu Glu
1 5 10 15

Asp Val Asn Ala
20

<210> 6

<211> 20

<212> PRT

<213> Lolium perenne

<400> 6

Glu Gln Lys Leu Leu Glu Asp Val Asn Ala Gly Phe Lys Ala Ala Val
1 5 10 15

Ala Ala Ala Ala
20

<210> 7
<211> 16
<212> PRT
<213> Lolium perenne

<400> 7
Gly Phe Lys Ala Ala Val Ala Ala Ala Asn Ala Pro Pro Ala Asp
1 5 10 15

<210> 8
<211> 20
<212> PRT
<213> Lolium perenne

<400> 8
Asn Ala Pro Pro Ala Asp Lys Phe Lys Ile Phe Glu Ala Ala Phe Ser
1 5 10 15

Glu Ser Ser Lys
20

<210> 9
<211> 20
<212> PRT
<213> Lolium perenne

<400> 9
Phe Glu Ala Ala Phe Ser Glu Ser Ser Lys Gly Leu Leu Ala Thr Ser
1 5 10 15

Ala Ala Lys Ala
20

<210> 10
<211> 20
<212> PRT
<213> Lolium perenne

<400> 10
Gly Leu Leu Ala Thr Ser Ala Ala Lys Ala Pro Gly Leu Ile Pro Lys
1 5 10 15

Leu Asp Thr Ala
20

<210> 11

<211> 20
<212> PRT
<213> Lolium perenne

<400> 11
Pro Gly Leu Ile Pro Lys Leu Asp Thr Ala Tyr Asp Val Ala Tyr Lys
1 5 10 15

Ala Ala Glu Gly
20

<210> 12
<211> 20
<212> PRT
<213> Lolium perenne

<400> 12
Tyr Asp Val Ala Tyr Lys Ala Ala Glu Gly Ala Thr Pro Glu Ala Lys
1 5 10 15

Tyr Asp Ala Phe
20

<210> 13
<211> 20
<212> PRT
<213> Lolium perenne

<400> 13
Ala Thr Pro Glu Ala Lys Tyr Asp Ala Phe Val Thr Ala Leu Thr Glu
1 5 10 15

Ala Leu Arg Val
20

<210> 14
<211> 20
<212> PRT
<213> Lolium perenne

<400> 14
Val Thr Ala Leu Thr Glu Ala Leu Arg Val Ile Ala Gly Ala Leu Glu
1 5 10 15

Val His Ala Val
20

<210> 15
<211> 20
<212> PRT
<213> Lolium perenne

<400> 15

Ile Ala Gly Ala Leu Glu Val His Ala Val Lys Pro Ala Thr Glu Glu
1 5 10 15

Val Pro Ala Ala
20

<210> 16
<211> 20
<212> PRT
<213> Lolium perenne

<400> 16
Lys Pro Ala Thr Glu Glu Val Pro Ala Ala Lys Ile Pro Thr Gly Glu
1 5 10 15

Leu Gln Ile Val
20

<210> 17
<211> 20
<212> PRT
<213> Lolium perenne

<400> 17
Lys Ile Pro Thr Gly Glu Leu Gln Ile Val Asp Lys Ile Asp Ala Ala
1 5 10 15

Phe Lys Ile Ala
20

<210> 18
<211> 20
<212> PRT
<213> Lolium perenne

<400> 18
Asp Lys Ile Asp Ala Ala Phe Lys Ile Ala Ala Thr Ala Ala Asn Ala
1 5 10 15

Ala Pro Thr Asn
.20

<210> 19
<211> 20
<212> PRT
<213> Lolium perenne

<400> 19
Ala Thr Ala Ala Asn Ala Ala Pro Thr Asn Asp Lys Phe Thr Val Phe
1 5 10 15

Glu Ser Ala Phe
20

<210> 20
<211> 20
<212> PRT
<213> Lolium perenne

<400> 20
Asp Lys Phe Thr Val Phe Glu Ser Ala Phe Asn Lys Ala Leu Asn Glu
1 5 10 15

Cys Thr Gly Gly
20

<210> 21
<211> 20
<212> PRT
<213> Lolium perenne

<400> 21
Asn Lys Ala Leu Asn Glu Cys Thr Gly Gly Ala Tyr Glu Thr Tyr Lys
1 5 10 15

Phe Ile Pro Ser
20

<210> 22
<211> 20
<212> PRT
<213> Lolium perenne

<400> 22
Ala Tyr Glu Thr Tyr Lys Phe Ile Pro Ser Leu Glu Ala Ala Val Lys
1 5 10 15

Gln Ala Tyr Ala
20

<210> 23
<211> 20
<212> PRT
<213> Lolium perenne

<400> 23
Leu Glu Ala Ala Val Lys Gln Ala Tyr Ala Ala Thr Val Ala Ala Ala
1 5 10 15

Pro Glu Val Lys
20

<210> 24
<211> 20
<212> PRT

<213> Lolium perenne

<400> 24

Ala Thr Val Ala Ala Ala Pro Glu Val Lys Tyr Ala Val Phe Glu Ala
1 5 10 15

Ala Leu Thr Lys
20

<210> 25

<211> 20

<212> PRT

<213> Lolium perenne

<400> 25

Tyr Ala Val Phe Glu Ala Ala Leu Thr Lys Ala Ile Thr Ala Met Thr
1 5 10 15

Gln Ala Gln Lys
20

<210> 26

<211> 20

<212> PRT

<213> Lolium perenne

<400> 26

Ala Ile Thr Ala Met Thr Gln Ala Gln Lys Ala Gly Lys Pro Ala Ala
1 5 10 15

Ala Ala Ala Thr
20

<210> 27

<211> 20

<212> PRT

<213> Lolium perenne

<400> 27

Ala Gly Lys Pro Ala Ala Ala Ala Thr Gly Ala Ala Thr Val Ala
1 5 10 15

Thr Gly Ala Ala
20

<210> 28

<211> 20

<212> PRT

<213> Lolium perenne

<400> 28

Gly Ala Ala Thr Val Ala Thr Gly Ala Ala Thr Ala Ala Gly Ala
1 5 10 15

Ala Thr Ala Ala
20

<210> 29
<211> 16
<212> PRT
<213> Lolium perenne

<400> 29
Thr Ala Ala Ala Gly Ala Ala Thr Ala Ala Gly Gly Tyr Lys Ala
1 5 10 15

<210> 30
<211> 20
<212> PRT
<213> Lolium perenne

<400> 30
Ile Ala Lys Val Pro Pro Gly Pro Asn Ile Thr Ala Glu Tyr Gly Asp
1 5 10 15

Lys Trp Leu Asp
20

<210> 31
<211> 20
<212> PRT
<213> Lolium perenne

<400> 31
Ile Ala Lys Val Xaa Pro Gly Xaa Asn Ile Thr Ala Glu Tyr Gly Asp
1 5 10 15

Lys Trp Leu Asp
20

<210> 32
<211> 20
<212> PRT
<213> Lolium perenne

<400> 32
Thr Ala Glu Tyr Gly Asp Lys Trp Leu Asp Ala Lys Ser Thr Trp Tyr
1 5 10 15

Gly Lys Pro Thr
20

<210> 33
<211> 20
<212> PRT

<213> Lolium perenne

<400> 33

Gly Ala Gly Pro Lys Asp Asn Gly Gly Ala Cys Gly Tyr Lys Asn Val
1 5 10 15

Asp Lys Ala Pro
20

<210> 34

<211> 20

<212> PRT

<213> Lolium perenne

<400> 34

Gly Ala Gly Pro Lys Asp Asn Gly Gly Ala Cys Gly Tyr Lys Asp Val
1 5 10 15

Asp Lys Ala Pro
20

<210> 35

<211> 20

<212> PRT

<213> Lolium perenne

<400> 35

Cys Gly Tyr Lys Asp Val Asp Lys Ala Pro Phe Asn Gly Met Thr Gly
1 5 10 15

Cys Gly Asn Thr
20

<210> 36

<211> 22

<212> PRT

<213> Lolium perenne

<400> 36

Cys Gly Phe Asn Gly Met Thr Gly Cys Gly Asn Thr Pro Ile Phe Lys
1 5 10 15

Asp Gly Arg Gly Cys Gly
20

<210> 37

<211> 20

<212> PRT

<213> Lolium perenne

<400> 37

Pro Ile Phe Lys Asp Gly Arg Gly Cys Gly Ser Cys Phe Glu Ile Lys
1 5 10 15

Cys Thr Lys Pro
20

<210> 38
<211> 20
<212> PRT
<213> Lolium perenne

<400> 38
Ser Cys Phe Glu Ile Lys Cys Thr Lys Pro Glu Ser Cys Ser Gly Glu
1 5 10 15

Ala Val Thr Val
20

<210> 39
<211> 20
<212> PRT
<213> Lolium perenne

<400> 39
Glu Ser Cys Ser Gly Glu Ala Val Thr Val Thr Ile Thr Asp Asp Asn
1 5 10 15

Glu Glu Pro Ile
20

<210> 40
<211> 20
<212> PRT
<213> Lolium perenne

<400> 40
Thr Ile Thr Asp Asp Asn Glu Glu Pro Ile Ala Pro Tyr His Phe Asp
1 5 10 15

Leu Ser Gly His
20

<210> 41
<211> 20
<212> PRT
<213> Lolium perenne

<400> 41
Ala Pro Tyr His Phe Asp Leu Ser Gly His Ala Phe Gly Ser Met Ala
1 5 10 15

Asp Asp Gly Glu
20

<210> 42
<211> 20
<212> PRT
<213> Lolium perenne

<400> 42
Ala Phe Gly Ser Met Ala Asp Asp Gly Glu Glu Gln Lys Leu Arg Ser
1 5 10 15

Ala Gly Glu Leu
20

<210> 43
<211> 20
<212> PRT
<213> Lolium perenne

<400> 43
Glu Gln Lys Leu Arg Ser Ala Gly Glu Leu Glu Leu Gln Phe Arg Arg
1 5 10 15

Val Lys Cys Lys
20

<210> 44
<211> 20
<212> PRT
<213> Lolium perenne

<400> 44
Glu Leu Gln Phe Arg Arg Val Lys Cys Lys Tyr Pro Asp Asp Thr Lys
1 5 10 15

Pro Thr Phe His
20

<210> 45
<211> 20
<212> PRT
<213> Lolium perenne

<400> 45
Tyr Pro Asp Asp Thr Lys Pro Thr Phe His Val Glu Lys Ala Ser Asn
1 5 10 15

Pro Asn Tyr Leu
20

<210> 46
<211> 20
<212> PRT
<213> Lolium perenne

<400> 46

Val Glu Lys Ala Ser Asn Pro Asn Tyr Leu Ala Ile Leu Val Lys Tyr
1 5 10 15

Val Asp Gly Asp
20

<210> 47

<211> 20

<212> PRT

<213> Lolium perenne

<400> 47

Val Glu Lys Gly Ser Asn Pro Asn Tyr Leu Ala Ile Leu Val Lys Tyr
1 5 10 15

Val Asp Gly Asp
20

<210> 48

<211> 20

<212> PRT

<213> Lolium perenne

<400> 48

Ala Ile Leu Val Lys Tyr Val Asp Gly Asp Gly Asp Val Val Ala Val
1 5 10 15

Asp Ile Lys Glu
20

<210> 49

<211> 20

<212> PRT

<213> Lolium perenne

<400> 49

Gly Asp Val Val Ala Val Asp Ile Lys Glu Lys Gly Lys Asp Lys Trp
1 5 10 15

Ile Glu Leu Lys
20

<210> 50

<211> 20

<212> PRT

<213> Lolium perenne

<400> 50

Lys Gly Lys Asp Lys Trp Ile Glu Leu Lys Glu Ser Trp Gly Ala Val
1 5 10 15

Trp Arg Ile Asp

<210> 51
<211> 20
<212> PRT
<213> Lolium perenne

<400> 51
Thr Pro Asp Lys Leu Thr Gly Pro Phe Thr Val Arg Tyr Thr Thr Glu
1 5 10 15

Gly Gly Thr Lys
20

<210> 52
<211> 20
<212> PRT
<213> Lolium perenne

<400> 52
Val Arg Tyr Thr Thr Glu Gly Gly Thr Lys Ser Glu Val Glu Asp Val
1 5 10 15

Ile Pro Glu Gly
20

<210> 53
<211> 20
<212> PRT
<213> Lolium perenne

<400> 53
Ser Glu Val Glu Asp Val Ile Pro Glu Gly Trp Lys Ala Asp Thr Ser
1 5 10 15

Tyr Ser Ala Lys
20

<210> 54
<211> 33
<212> PRT
<213> Lolium perenne

<400> 54
Ala Asp Ala Gly Tyr Thr Xaa Ala Ala Ala Ala Thr Xaa Ala Thr Xaa
1 5 10 15

Ala Ala Thr Xaa Ala Ala Ala Gly Gly Lys Ala Thr Thr Asp Glu Gln
20 25 30

Lys

<210> 55
<211> 20
<212> PRT
<213> Lolium perenne

<400> 55
Ala Lys Ser Thr Trp Tyr Gly Lys Pro Thr Gly Ala Gly Pro Lys Asp
1 5 10 15

Asn Gly Gly Ala
20

<210> 56
<211> 20
<212> PRT
<213> Lolium perenne

<400> 56
Glu Ser Trp Gly Ala Val Trp Arg Ile Asp Thr Pro Asp Lys Leu Thr
1 5 10 15

Gly Pro Phe Thr
20

<210> 57
<211> 1181
<212> DNA
<213> Lolium perenne

<220>
<221> CDS
<222> (53)..(961)

<220>
<221> mat_peptide
<222> (125)

<400> 57
gaattcgagg atccgggtac catggctccg acaaaccaac gcaagagcag ca atg gca 58
Met Ala

gtg cag cag tac acg gtg gcg ctg ttc ctg gcc gtg gcc tcg tgt cgg 106
Val Gln Gln Tyr Thr Val Ala Leu Phe Leu Ala Val Ala Ser Cys Arg
-20 -15 -10

gcc cgc gcc tcc tac gcc gac gcc ggc tac gcc ccc gcc act ccc 154
Ala Arg Ala Ser Tyr Ala Ala Asp Ala Gly Tyr Ala Pro Ala Thr Pro
-5 -1 1 5 10

gcc acc ccg gct acc ccc gcg gcc cca ggc gca gcg gtg cca gca ggg 202
Ala Thr Pro Ala Thr Pro Ala Ala Pro Gly Ala Ala Val Pro Ala Gly
15 20 25

aag gcg gcg acc gag gag cag aag ctg atc gag aag atc aac gcc ggc 250

Lys Ala Ala Thr Glu Glu Gln Lys Leu Ile Glu Lys Ile Asn Ala Gly
30 35 40

ttc aag gcc gcc gtc gcg gcc ggc gtc ccc cca ggc gac aag 298
Phe Lys Ala Ala Val Ala Ala Ala Gly Val Pro Pro Gly Asp Lys
45 50 55

tac aag acg ttc gtc gaa acc ttc ggc aag gcc tcc aac aag gcc ttc 346
Tyr Lys Thr Phe Val Glu Thr Phe Gly Lys Ala Ser Asn Lys Ala Phe
60 65 70

ctg ggg gac ctc ccg acc aac tac gcc gat gtc aac tcc agg gcc cag 394
Leu Gly Asp Leu Pro Thr Asn Tyr Ala Asp Val Asn Ser Arg Ala Gln
75 80 85 90

ctc acc tcg aag ctc gac gcc tac aag ctc gac gac gcc 442
Leu Thr Ser Lys Leu Asp Ala Ala Tyr Lys Leu Ala Tyr Asp Ala Ala
95 100 105

cag ggc gcc acc ccc gag gcc aag tac gac gcc tac gtc gcc acc ctc 490
Gln Gly Ala Thr Pro Glu Ala Lys Tyr Asp Ala Tyr Val Ala Thr Leu
110 115 120

agc gag gcg ctc cgc atc atc gcc ggc acc ctc gag gtc cac gcc gtc 538
Ser Glu Ala Leu Arg Ile Ile Ala Gly Thr Leu Glu Val His Ala Val
125 130 135

aag ccc gct gcc gag gag gtc aag cct atc ccc gcc gga gag ctg cag 586
Lys Pro Ala Ala Glu Glu Val Lys Pro Ile Pro Ala Gly Glu Leu Gln
140 145 150

atc gtc gac aag att gac gtc gcc ttc aga act gcc gcc acc gcc gcc 634
Ile Val Asp Lys Ile Asp Val Ala Phe Arg Thr Ala Ala Thr Ala Ala
155 160 165 170

aac gcc gcc ccc acc aac gac aag ttc acc gta ttc gag acc acc ttt 682
Asn Ala Ala Pro Thr Asn Asp Lys Phe Thr Val Phe Glu Thr Thr Phe
175 180 185

aac aag gcc atc aag gag agc acg ggc ggc acc tac gag agc tac aag 730
Asn Lys Ala Ile Lys Glu Ser Thr Gly Gly Thr Tyr Glu Ser Tyr Lys
190 195 200

ttc att ccc acc ctt gag gcc gcc gtt aag cag gcc tac gcc gac acc 778
Phe Ile Pro Thr Leu Glu Ala Ala Val Lys Gln Ala Tyr Ala Ala Thr
205 210 215

gtc gca tcc gcg ccg gag gtc aag tac gcc gtc ttt gag acc gcg ctg 826
Val Ala Ser Ala Pro Glu Val Lys Tyr Ala Val Phe Glu Thr Ala Leu
220 225 230

aaa aag gcg gtc acc gcc atg tcc gag gcc cag aag gaa gcc aag ccc 874
Lys Lys Ala Val Thr Ala Met Ser Glu Ala Gln Lys Glu Ala Lys Pro
235 240 245 250

gcc acc gcc acc ccg acc ccc acc gca act gcc gcg gcc gcg gtg gcc 922
Ala Thr Ala Thr Pro Thr Ala Thr Ala Ala Ala Val Ala

255

260

265

acc aac gcc gcc ccc gtc gct ggt ggc tac aaa atc tgatcaactc 971
 Thr Asn Ala Ala Pro Val Ala Ala Gly Gly Tyr Lys Ile
 270 275

gctagcaata tacacatcca tcatgcacat atagagctgt gtatgtatgt gcatgcacgc 1031
 cgtggcgccg cgcaagttt ctcataatta attcttggtt ttctggctt gcatccacga 1091
 gcgaccgagc ccgtggatag tcgcattgtgt atgtaatttt ttctgagaaa tgtgtatatg 1151
 taatatataa ttgagtacta aaaaaaaaaa 1181

<210> 58
 <211> 279
 <212> PRT
 <213> Lolium perenne

<400> 58

Ala Asp Ala Gly Tyr Ala Pro Ala Thr Pro Ala Thr Pro
 1 5 10 15

Ala Ala Pro Gly Ala Ala Val Pro Ala Gly Lys Ala Ala Thr Glu Glu
 20 25 30

Gln Lys Leu Ile Glu Lys Ile Asn Ala Gly Phe Lys Ala Ala Val Ala
 35 40 45

Ala Ala Ala Gly Val Pro Pro Gly Asp Lys Tyr Lys Thr Phe Val Glu
 50 55 60

Thr Phe Gly Lys Ala Ser Asn Lys Ala Phe Leu Gly Asp Leu Pro Thr
 65 70 75 80

Asn Tyr Ala Asp Val Asn Ser Arg Ala Gln Leu Thr Ser Lys Leu Asp
 85 90 95

Ala Ala Tyr Lys Leu Ala Tyr Asp Ala Ala Gln Gly Ala Thr Pro Glu
 100 105 110

Ala Lys Tyr Asp Ala Tyr Val Ala Thr Leu Ser Glu Ala Leu Arg Ile
 115 120 125

Ile Ala Gly Thr Leu Glu Val His Ala Val Lys Pro Ala Ala Glu Glu
 130 135 140

Val Lys Pro Ile Pro Ala Gly Glu Leu Gln Ile Val Asp Lys Ile Asp
 145 150 155 160

Val Ala Phe Arg Thr Ala Ala Thr Ala Ala Asn Ala Ala Pro Thr Asn
 165 170 175

Asp Lys Phe Thr Val Phe Glu Thr Thr Phe Asn Lys Ala Ile Lys Glu
180 185 190

Ser Thr Gly Gly Thr Tyr Glu Ser Tyr Lys Phe Ile Pro Thr Leu Glu
195 200 205

Ala Ala Val Lys Gln Ala Tyr Ala Ala Thr Val Ala Ser Ala Pro Glu
210 215 220

Val Lys Tyr Ala Val Phe Glu Thr Ala Leu Lys Lys Ala Val Thr Ala
225 230 235 240

Met Ser Glu Ala Gln Lys Glu Ala Lys Pro Ala Thr Ala Thr Pro Thr
245 250 255

Pro Thr Ala Thr Ala Ala Ala Val Ala Thr Asn Ala Ala Pro Val
260 265 270

Ala Ala Gly Gly Tyr Lys Ile
275

<210> 59

<211> 20

<212> PRT

<213> Lolium perenne

<400> 59

Ala Asp Ala Gly Tyr Thr Xaa Ala Ala Ala Ala Thr Xaa Ala Thr Xaa
1 5 10 15

Ala Ala Thr Xaa
20

<210> 60

<211> 20

<212> PRT

<213> Lolium perenne

<400> 60

Ala Thr Xaa Ala Thr Xaa Ala Ala Ala Thr Xaa Ala Ala Ala Gly Gly Lys
1 5 10 15

Ala Thr Thr Asp
20

<210> 61

<211> 303

<212> PRT

<213> Lolium perenne

<400> 61

Met Ala Val Gln Gln Tyr Thr Val Ala Leu Phe Leu Ala Val Ala Ser
-20 -15 -10

Cys Arg Ala Arg Ala Ser Tyr Ala Ala Asp Ala Gly Tyr Ala Pro Ala
-5 -1 1 5

Thr Pro Ala Thr Pro Ala Thr Pro Ala Ala Pro Gly Ala Ala Val Pro
10 15 20

Ala Gly Lys Ala Ala Thr Glu Glu Gln Lys Leu Ile Glu Lys Ile Asn
25 30 35 40

Ala Gly Phe Lys Ala Ala Val Ala Ala Ala Gly Val Pro Pro Gly •
45 50 55

Asp Lys Tyr Lys Thr Phe Val Glu Thr Phe Gly Lys Ala Ser Asn Lys
60 65 70

Ala Phe Leu Gly Asp Leu Pro Thr Asn Tyr Ala Asp Val Asn Ser Arg
75 80 85

Ala Gln Leu Thr Ser Lys Leu Asp Ala Ala Tyr Lys Leu Ala Tyr Asp
90 95 100

Ala Ala Gln Gly Ala Thr Pro Glu Ala Lys Tyr Asp Ala Tyr Val Ala
105 110 115 120

Thr Leu Ser Glu Ala Leu Arg Ile Ile Ala Gly Thr Leu Glu Val His
125 130 135

Ala Val Lys Pro Ala Ala Glu Glu Val Lys Pro Ile Pro Ala Gly Glu
140 145 150

Leu Gln Ile Val Asp Lys Ile Asp Val Ala Phe Arg Thr Ala Ala Thr
155 160 165

Ala Ala Asn Ala Ala Pro Thr Asn Asp Lys Phe Thr Val Phe Glu Thr
170 175 180

Thr Phe Asn Lys Ala Ile Lys Glu Ser Thr Gly Gly Thr Tyr Glu Ser
185 190 195 200

Tyr Lys Phe Ile Pro Thr Leu Glu Ala Ala Val Lys Gln Ala Tyr Ala
205 210 215

Ala Thr Val Ala Ser Ala Pro Glu Val Lys Tyr Ala Val Phe Glu Thr
220 225 230

Ala Leu Lys Lys Ala Val Thr Ala Met Ser Glu Ala Gln Lys Glu Ala
235 240 245

Lys Pro Ala Thr Ala Thr Pro Thr Pro Thr Ala Thr Ala Ala Ala Ala
250 255 260

Val Ala Thr Asn Ala Ala Pro Val Ala Ala Gly Gly Tyr Lys Ile
265 270 275